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ABSTRACT

Experimental instructional projects and educational programs generated by teachers at the Big Ten universities are described in this annual report. The purpose is to exchange information among college teachers, administrators, and educational researchers about ways to improve the conditions for learning. Most of the reports focus on changes in a particular discipline area, but many can be adapted for use in other departments and interdisciplinary programs. Department-based projects are described in this report in the following subject-matter areas: agriculture, anthropology, architecture, astronomy, botany, classics, computer science, cultural studies, dentistry, economics, engineering, English, family studies, geography, history, language, law, library science, medicine, physical education, physics, social work, and zoology. Descriptions of institutional facilities, instructional media arrangements, and broad programs spanning different disciplines are included in a second section of this report, and a third section provides a cumulative index to all 13 annual reports. (LBH)

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talents on matters of mutual concern
in higher education.



Development and Experiment in College Teaching

No. 13
Spring 1977

Prepared and distributed
by the CIC Panel on Research
and Development of Instructional
Resources

Foreword

These annual reports are collections of experimental instructional projects and educational programs generated by teachers at the Big Ten universities. Our purpose is to exchange information among college teachers, administrators, and educational researchers about ways to improve the conditions for learning. Most of the reports focus on changes in a particular discipline area, but many of these arrangements can be easily adapted for use in other departments and interdisciplinary programs. Department names change, so scan the contents and cumulative contents for topics related to your interests.

The entries in Section I, Subject-Matter Area, describe department-based projects. Section II, Institutional Support, includes descriptions of institutional facilities, instructional media arrangements, and broad programs which span different disciplines. Section III is the Cumulative Index to all thirteen reports. This index has been updated by deleting references to projects that are no longer active; the Archival Index lists these inactive projects.

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Contents

Foreword	iii
University Representatives	iv
SUBJECT-MATTER AREA	
AGRICULTURE	
New Curriculum and Teaching Methods in Pest Management	3
ANTHROPOLOGY	
Computer Analysis of Data on Cultural Change	4
ARCHITECTURE	
Problem Solving and Decision Making Skills in First-Year Design	5
ASTRONOMY	
An Audio-Visual Program in Introductory Astronomy	6
BOTANY	
Computer Simulated Laboratories in Botany	7
CLASSICS	
Technical Terminology of Science, Medicine and Humanities	8
COMPUTER SCIENCE	
A Self-Paced Instructional System in Basic Computer Programming	9
CULTURAL STUDIES	
Foreign Student Resources Add an Intercultural Perspective	10
Intercultural Communication and Issues in Freshman Rhetoric Classes	11

DENTISTRY

The Programmed Lecture in Oral Surgery	12
--	----

ECONOMICS

Audio and Videotapes in Elementary Economics Courses	13
--	----

ENGINEERING

Computer Graphics in Chemical Engineering Gaming and Simulation	14
Graduate Electrical Engineering Mini-Courses	15

ENGLISH

A Special Program in English Composition for Science Majors	16
Teaching William Blake's Illuminated Poems	17

FAMILY STUDIES

Using Fiction and Drama to Teach about Family Relationships	18
---	----

GEOGRAPHY

The Audio-Tutorial System in Basic Earth Sciences	19
A Self-Paced Course in Human Geography	20

HISTORY

Course Revision in European History	21
Educational Television in Medieval and Renaissance Studies	22

LANGUAGE

Videotape Cassettes for Teaching Japanese	23
---	----

LAW

Clinical Studies Through Group Legal Services	24
---	----

LIBRARY SCIENCE

Library Science Practicum Program	25
-----------------------------------	----

MEDICINE

Clinical Simulations in Introductory Medicine	26
Personalized Study in a Psychiatry Clerkship	27
Clinical Teaching for Instructional Development	28
Improving Teaching Methods of Health Professionals	29

PHYSICAL EDUCATION

Block Program--Professional Preparation of Teachers	30
---	----

PHYSICS

A PSI Sequence in General Physics	31
Physics of Music	32

SOCIAL WORK

Youth Studies--The Undergraduate Collateral	33
---	----

ZOOLOGY

Use of Videotape in an Introductory Biology Laboratory	34
--	----

INSTITUTIONAL SUPPORT

AUTOMATION AND TECHNOLOGY

A Classroom Management System to Maintain Student Progress Records	37
Computerized Assignment and Instructional Strategy Distribution	38
Computer Simulation of Attitude Change in Complex Social Settings	39
Computer Graphics in Undergraduate Education	40

EXTRA-DEPARTMENTAL PROGRAMS FOR THE INDIVIDUAL STUDENT

A New School of Continuing Studies	41
------------------------------------	----

FACULTY DEVELOPMENT

Instructor-designed Questionnaires for Collecting Student Reactions to Instruction	42
College Classroom Video Vignettes	43
A Seminar and Practicum in Instructional Development	44

INTERDISCIPLINARY PROGRAMS AND COURSES

Integrated Science Program	45
Interprofessional Education	46

CUMULATIVE INDEX	47
------------------	----

I. Subject-Matter Area

AGRICULTURE

New Curriculum and Teaching Methods in Pest Management

A new pest management curriculum, designed to provide students with an agro-ecosystem approach to the problems of pest control, has been developed at Michigan State University. This curriculum was based on the belief that the most cost-effective pest control can be achieved by dealing with the component interactions of the agro-ecosystem (pests, crops, and other living and non-living components).

The new pest management curriculum is composed of: a) introductory courses including entomology, pesticides and environmental quality; b) a core of five existing pest-oriented courses including Principles of Weed Control, Economic Entomology, etc.; and c) three new pest management courses. The inclusion of existing courses as a major component of the pest management curriculum posed a serious problem because these usually dealt with a single control measure rather than their interaction. A set of six self-instructional audiovisual modules was developed to augment these courses.

Two computer-based simulation games, ORCHARD and RESISTANCE, were developed to give students practice in problem solving. RESISTANCE simulates the way in which an insect population develops a resistance to control measures. ORCHARD simulates a predator/prey relationship in an orchard with variables that a student can manipulate.

Development of the pest management curriculum has been supported by grants from the MSU Educational Development Program, the National Science Foundation and the Ford Foundation Venture Fund.

For further information, contact Dr. George S. Ayers, Entomology Department, Michigan State University, 331 Natural Science Building, East Lansing, Michigan 48824.

ANTHROPOLOGY

Computer Analysis of Data on Cultural Change

Students in an anthropology course have gained a deeper understanding of social and cultural change by using a computer to analyze data from Mexico. The data came from research conducted by the instructor, Professor Frank Miller, and Cynthia Cone, Assistant Professor of Anthropology at Hamline University, St. Paul, Minnesota. In the class they used color slides to illustrate lectures on the research sites and on the development policies of the Mexican government. From Professor Miller's book, Old Village and a New Town: Industrialization in Mexico, students gained further information about trends of change in Mexico and about ways to integrate quantitative data from surveys with qualitative data from field work. They also received a packet of mimeographed materials: three chapters of Dr. Cone's Ph.D. dissertation, with historical and cultural background, but no results; the codebook for the data, which came from a household survey with more than 600 interviews; and a ten-page explanation, written by teaching assistant Paul Maxwell, of a few basic procedures for computer analysis using the Statistical Package for the Social Sciences (SPSS).

The class of fifty students worked in groups of five for about three weeks to learn the basic procedures. Then each group was asked to imagine that it was a research team engaged by the Mexican government to write a report about the region and to make recommendations for a development program. Ten specific questions were suggested as a starting point. Each group planned its analysis of the data, divided up the work of running jobs on the computer, and presented an oral report to the class.

Since only four students in the class had any previous experience with computers or statistical analysis, most of the class approached the project with attitudes ranging from mild apprehension to fear and trembling. At the end of the course, over 90% recommended using it again, and some were delighted to discover that computers are not as mysterious as they had believed.

For further information, contact Professor Frank Miller, Department of Anthropology, University of Minnesota, Minneapolis, Minnesota 55455.

ARCHITECTURE

Problem Solving and Decision Making Skills in First-Year Design

New instructional materials incorporated in a new instructional strategy provide an introduction to "real world" problem-solving situations for first-year design students. A typical design project was developed into a model simulation of the steps, issues, processes and skills involved in architectural/landscape architectural problem solving and decision making. Although in somewhat simplified form, nearly all phases of a design project are included in the simulation, including client communications, site selections, environmental impact review, project design, and relations with governmental agencies.

During 1976-77 the simulation/game was presented in a design studio course over a 10-week quarter. Student interaction with the simulation was directed by a model and a manual developed by the instructors as an overall reference framework to which specific design issues, processes and skills could be related. The instructors were included in the simulation as consultants to whom the students could refer throughout the quarter.

The student is able to test alternative strategies and to experience the interrelation of factors within the overall decision-making process. Experience this year emphasizes that early involvement in a whole decision-making process/design project provides a framework for better understanding of the various parts of the design process. Refinement and expansion of the simulation and manual of materials are being carried out based on student use during 1976-77. A computer-based version of the simulation is projected for direct student interaction prior to use in 1977-78.

For further information, contact Assistant Professors Lance Lavine and John Tietz, School of Architecture and Landscape Architecture, University of Minnesota, Minneapolis, Minnesota 55455.

ASTRONOMY

An Audio-Visual Program in Introductory Astronomy

An introductory astronomy course suffers from two major problems: the diversity of student backgrounds and, in large lecture sections, the general lack of opportunity for student participation in discussions. The diversity among students may discourage discussion, since the less knowledgeable student often has no basis for participation. Three members of The Ohio State University Astronomy Department, W.M. Protheroe, E.R. Capriotti and G.H. Newsom, have developed an audio-visual program in astronomy to foster an active learning situation for all students.

The program materials, published by the Charles E. Merrill Publishing Company, consist of eighteen audio-visual modules and an integrated textbook. Each module has a film strip of approximately 45 frames and a 35-minute audio tape. Since the program is designed for one term, modules are assigned for study at a rate of one or two per week and assume the burden of transferring large amounts of factual information in an individualized learning situation. This enables the course instructor to devote attention to developing and integrating the basic concepts of the subject matter. The audio-visual modules have the advantage of allowing a student with a deficient background to repeat material and to develop the necessary background.

Although the program has some aspects of the auto-tutorial approach, it was not developed expressly for that purpose. After studying the appropriate module or modules, the class meets for a lecture session. In addition, the class is organized into discussion sections of 25 to 30 students which meet weekly with the instructor or a graduate teaching associate to clarify the material presented in the modules. The program, introduced in the summer quarter 1976, is now undergoing a comparative evaluation in which each of the authors will teach a 200-student section by the audio-visual method and another section by the standard lecture method. Results indicate that the audio-visual technique has proven beneficial for the weaker students, while still holding the interest of the better prepared students. It has succeeded in teaching large numbers of students in a more personalized way than the conventional large lecture method, and it has been well received by students.

For additional information, contact Professors W.M. Protheroe, E.R. Capriotti or G.H. Newsom, Department of Astronomy, The Ohio State University, Smith Laboratory, 174 West 18th Avenue, Columbus, Ohio 43210.

BOTANY

Computer Simulated Laboratories in Botany

As part of intensive efforts to make introductory botany labs interesting and valuable for non-majors, a simulated laboratory was developed on the PLATO computer system at the University of Illinois. Using a keyboard and plasma display panel (similar to a TV screen), students interact directly with the computer using self-paced, individualized instruction. Lessons use animation, graphics, microfiche projection, gaming techniques, programmed text and frequent questions, to parallel laboratory exercises in the course. The simulated exercises were completed in two-thirds less time than required for "hands-on" exercises. Computer laboratories, therefore, were expanded to a) review related material before each project; b) provide help sequences; c) provide additional experiments, many of which were impossible in regular laboratory because of inadequate time or equipment; and d) test more intensively. All PLATO lessons and exams were completely self-contained.

To compare the simulated laboratory to the regular laboratory, we identified specific skills acquired from the regular lab experience: a) manual skills--ability to use instruments or techniques; b) instruments and techniques--conceptual understanding of use and limitations; c) recognition--ability to identify organisms, tissues and cells from diagrams, slides and models; d) facts--ability to recall; e) mental dexterity--ability to use formulae, interpret graphs, etc.; f) interpretation--ability to draw conclusions from data, graphs, etc.; and g) application--ability to use any of the above to solve problems. A comprehensive exam, testing these skills through written and practical components, was administered to both groups. Comparisons of attitudes toward all aspects of the course, achievement on lecture exams and in discussion, and attendance were also used to evaluate differences between the two groups.

PLATO students were more positive (not significantly) toward laboratory sessions, had significantly better attendance in lecture, laboratory and discussion, and achieved slightly (not significantly) better in lecture and discussion than other students. The only significant difference was in "manual" laboratory skills, where PLATO students were a third less proficient (measured primarily as accuracy). Because PLATO students achieved slightly higher overall than students in traditional laboratory, we continue to use simulated laboratories as an elected alternative to regular laboratory.

For further information, contact Dr. Alan Haney, Department of Botany, University of Illinois, Urbana, Illinois 61801.

CLASSICS

Technical Terminology of Science, Medicine and Humanities

The Classics Department of the University of Minnesota has created computer-based instructional programs for teaching technical terminology and vocabulary. These programs are the major resource for a course the department has taught for the past thirty years by textbook and lecture. Approximately 450 students per year (about 150/quarter) have enrolled in this course. About 70 student contact hours of computer-based programs were used for the first time in 1976-1977, with great success. The instructors, as authors, believe that the programs can not only make a practical contribution to the development of essential skills and concepts, but can also demonstrate the potential contributions of humanistic studies to scientific and professional fields. This medium also encourages curiosity about and appreciation for the origins and cultural history of words.

The following four types of programs make up the materials used in 1976-1977: 1) A basic program which deals primarily with prefixes, suffixes, certain high-frequency roots, principles of compounding, and histories of word derivations. 2) A program in medical terminology designed specifically for pre-medical students and those preparing for other specialties in the health sciences. 3) A program of vocabulary building for students in liberal arts and pre-professional programs; this program presents a systematic approach to the rapid acquisition of vocabulary through etymological analysis and the introduction of carefully selected roots. 4) A program for technical terms in agriculture and agricultural journalism.

Continuing input and collaboration has been received from eight consultants from specialized fields. Evaluations of use during 1976-1977 have been carried out, including external evaluations assisted by Professor Joseph Teblen of Ohio State University and Professor Richard Scanlan of the University of Illinois.

For further information, contact Professors Robert Sonkowsky, Chairman, or Gerald Erickson, Department of Classics, University of Minnesota, Minneapolis, Minnesota 55455.

COMPUTER SCIENCE

A Self-Paced Instructional System in Basic Computer Programming

The basic computer programming course at Michigan State University enrolls approximately 2,100 students per year. Although student performance had been adequate, it was believed that a self-paced mastery instructional model would contribute to the improvement of student morale, desire to learn, and achievement. The objectives of the self-paced program were: a) to enable students to learn at their own rates; b) to specify goals and levels of achievement required for a given grade; c) to provide an accelerated course for students with some previous computer science background; and d) to develop student confidence in learning independently.

The course was designed to include 24 mastery units. The materials for each unit included: a) an overview of the subject matter to be learned; b) a list of behavioral objectives; c) a list of instructional activities; d) self-assessment instruments with immediate feedback; e) four alternate mastery evaluation instruments; and f) supplementary information necessary to achieve the unit objectives.

The instructional model involved student use of the prescribed learning activities in the self-instructional text and solution of computer programming problems. Students encountering difficulties were encouraged to visit the course learning center where they were given tutorial assistance by undergraduate consultants. After completing a unit, students took a mastery test which was scored immediately. Additional tutorial assistance was provided for those who did not achieve mastery, and a retest was given the following day. When mastery was achieved, the student went on to the next unit and repeated the cycle.

In addition to the programmed text, computerized record keeping and grading programs were developed for the self-paced instructional system. These programs provide a daily posting of student progress and a permanent file for student or tutor access. In addition, there is currently a computerized test item pool of over 2,000 items and a computer-based test generation program which is flexible enough that no two students take the same mastery exams.

For further information, contact Dr. Floyd E. Lecureux, Department of Computer Science, 404A Computer Center, Michigan State University, East Lansing, Michigan 48824.

CULTURAL STUDIES

Foreign Student Resources Add an Intercultural Perspective

For more than a year Josef Mestenhauser, Professor and Associate Director of the International Student Advisors Office (ISAO), and other ISAO staff members have been working on a project called "Learning with Foreign Students." Their efforts include defining formats in which foreign students may contribute their experiences to enrich the curriculum, working with interested faculty to develop learning experiences involving foreign students, and orienting and recruiting foreign student participants. More than 200 foreign students from 67 countries participated in the program last year. Their names were entered into a resource file according to country, field of study and interest specialties. Faculty members who wanted to incorporate foreign students into their course curriculum were polled and interviewed by Diana Beitz, Associate Director of the Learning Project.

Possible cross-cultural learning objectives have been identified in a 70-page handbook entitled Learning with Foreign Students recently published by ISAO. The objectives involve study in seven areas: socialization and leadership systems; country and area studies; cross-cultural learning; cross-cultural communication; national and international conflicts; cross-cultural dimensions of education; and cross-cultural perspectives on development and underdevelopment. Involvement of foreign students depends on the cross-cultural learning objectives and the nature of the course itself. Possible formats include one-to-one interviews with foreign students, role playing and simulation, lectures on pre-assigned topics for colloquia, and use of the students as resource persons for group discussions, term paper projects, study abroad or practicum units. During the past two years, faculty members from the departments of Education, Home Economics, Agriculture, Business and Medicine took part in the program, drawing on 200 foreign student volunteers. In 1976-77 foreign students and ISAO staff members assisted Mestenhauser with two College of Liberal Arts colloquia, "Religions of the World" and "Crucial Issues: Hunger and Population," and with a seminar on international education for the College of Education.

For further information contact Josef Mestenhauser, Professor and Associate Director of the International Student Advisors Office, University of Minnesota, Minneapolis, Minnesota 55455.

Intercultural Communication and Issues in Freshman Rhetoric Classes

The University of Iowa's Rhetoric Program is engaged in an experiment combining intercultural communication and issues with the development of communication skills in reading, writing, and speaking in required freshman rhetoric classes. The project is being funded by the U.S. Office of Education as a joint venture of the Rhetoric Program and the Office of International Education and Services. Most importantly, the grant provides for the teaching of four semester-long classes and for the development of at least six learning units which combine some specified goals of a rhetoric course with intercultural communication and/or some intercultural topic.

Two classes from the one-semester Advanced Rhetoric course were taught during the fall semester, 1976. Two more are currently being taught in the two-semester sequence, one in each of the two parts of the sequence. Cynthia Bathurst-Rodgers and Debra Bunch, teaching assistants who are planning and teaching these classes, have found that achieving the goals of improvement in oral and written communication and proficiency in investigating, analyzing and responding to the ideas, beliefs and attitudes of other speakers and writers has been enhanced by the interaction and interest of a class consisting of American and international students.

Two- to three-week learning units with cross-cultural emphasis covering communication, composition, media, interviewing, sex roles, race and racism, religion, and health have already been developed for use in rhetoric classes with the help of faculty members from various departments of the University. A workshop for rhetoric instructors was offered at the beginning of the current spring semester by Ms. Bathurst-Rodgers and Gary Althen, a foreign student advisor, to familiarize interested rhetoric instructors with the unit on intercultural communication. This unit was first developed and used in three classes in the fall semester, 1975, and led to the development of the semester-long classes. The workshop focused on how to incorporate the unit into a class and how the unit fulfills the goals of a rhetoric course. Eight of the nine instructor-participants plan to use all or part of the unit in their classes.

For additional information, contact Donovan Ochs, Coordinator, or Cynthia Bathurst-Rodgers, Rhetoric Program, University of Iowa, Iowa City, Iowa 52242.

DENTISTRY

The Programmed Lecture in Oral Surgery

During the last decade, dental schools have been exploring alternatives to traditional curricula and methods of instruction. However, in searching for new alternatives, educators have overlooked the possibility of modifying the lecture format. The technique of the programmed lecture allows students to participate actively in a large group presentation with continual feedback between student and instructor. The planning and presentation of the programmed lecture involves the following steps: a) establishing objectives for the presentation; b) formulating a major problem or case for structuring the information; c) constructing a series of questions with multiple choice answers; d) circulating problems or cases with questions prior to the lecture presentation and asking students to commit themselves to an optional answer; and e) disseminating information on the lecture topic by engaging students in an interaction based upon their previously written response to the questions.

A programmed lecture format was developed for third year dental students at the University of Illinois on the topic of Periapical Infections. The class proceeded through simulated diagnostic problems utilizing basic science data to arrive at a diagnosis. At the end of the quarter, 83 students assessed the programmed lecture method of instruction, agreeing that the programmed lecture allowed for interaction with the instructor, provided students with step-by-step feedback on the material in the presentation, and covered the objectives of the presentation in a systematic manner. However, students did not feel that the programmed lecture forced students to read textbooks before attending class, resulted in students' feeling better prepared for examinations, or limited the possibility of decreased attention during the presentation.

In general, student comments indicated that relation of the programmed lecture to clinical experience provided the greatest appeal. Although there is some problem with delivery, these articulated difficulties will assist instructors in revision of the questions and improvement of their teaching behavior.

For additional information, contact Annette Yonke or Abdul Sajid, Center for Educational Development, University of Illinois at the Medical Center, 833 South Wood, Urbana, Illinois 61801.

ECONOMICS

Audio and Videotapes in Elementary Economics Courses

The Department of Economics at the University of Wisconsin-Madison is developing a series of audio and videotapes to assist both students and teaching assistants in elementary economics courses. In the fall term, 1975, the department taught over 2,900 students in its three elementary economics courses--an increase of 900 students since fall, 1970. Because of limited staff we have had to rely increasingly on large lectures (of up to 600 students) to accommodate growing student demand. The fast pace and difficulty of these courses, combined with the diversity of student abilities and skills, makes it essential that we offer additional ways for students to reinforce their learning and to resolve particular points of misunderstanding.

The audio and videotapes being prepared for students cover: a) language of economics; b) utilization of graphs, diagrams, and mathematical concepts; c) economics as a method of inquiry; and d) application of economic concepts to a variety of practical situations. The materials are available to students through the Laboratory for Recorded Instruction.

Each year the Department of Economics hires approximately 20 new teaching assistants, most of whom teach in the elementary course. Many are first- and second-year graduate students, heavily involved in their own coursework and lacking teaching experience. The audio and videotapes being prepared for teaching assistants are of three types. The first illustrates various methods and techniques of teaching certain key economic concepts and tools of analysis. The second demonstrates how to develop and employ applications so that students can see more clearly the links between the formal approach of economics and practical applications. The third and most important set focuses on teaching tips and strategies for new TAs, such as techniques for leading discussion, handling classroom problems, and evaluating student papers.

For additional information, contact Professor W. Lee Hansen, Department of Economics, University of Wisconsin-Madison, Madison, Wisconsin 53706.

ENGINEERING

Computer Graphics in Chemical Engineering Gaming and Simulation

The computer-based simulation and gaming system used at the University of Michigan has proven a valuable educational and motivational aid. While most of the modules focus on the reactor engineering course, a comprehensive simulation of a styrene microplant is used in the undergraduate laboratory course. The theory incorporated into each simulation encourages the student to practice design strategy, the basis of intellectual learning which is often ignored in other classes. The competitive nature of the games motivates students to practice even the most tedious drills.

A major goal of these simulations is to increase students' decision-making capabilities, allowing them to travel a path with multiple branching points. By increasing decision-making capabilities in vague or ill-defined situations, ability to synthesize will be increased (cf. Bloom, et al.). These simulations are also designed to develop students' analytical abilities by encouraging penetrating questions. This technique is implemented through a series of diagnostic tests on a simulated microplant not operating up to capacity. The student selects an equipment unit and experiments to test whether it is operating at maximum capacity. For example, one choice is to inject a tracer to determine if the reactor is channeling; the results are displayed on the graphics terminal as a plot of the outlet tracer concentrations as a function of time. Once the malfunction has been located, the student suggests corrections to return plant operation to maximum production.

Experience to date shows that the most popular games are ones that are fun to play. The overwhelming favorite is the Lt. Colombo Murder Mystery, utilizing basic chemical engineering reactor design principles for a series of calculations to select a murderer from five suspects. Each time a student signs on the computer a random suspect is chosen as the murderer, so the game is always different.

The system can be executed via any of several graphics terminals linked to the Michigan Terminal System. The print speed and graph plotting abilities of these terminals allow for rapid data transfer to the user and eliminate boring delays. The support computer may be used to accumulate substantial data on student performance and system usage.

For further information, contact H. Scott Fogler, Department of Chemical Engineering, The University of Michigan, Ann Arbor, Michigan 48109.

Graduate Electrical Engineering Mini-Courses

Since 1975, Purdue faculty members in the areas of Communications and Solid State Materials and Devices, School of Electrical Engineering, have developed and presented a variety of specialized mini-courses to satisfy two distinct needs. First, each mini-course treats a current topic which, while important, is not broad enough to warrant a full three-credit course. Secondly, the topics are selected because of their currency and the importance of work in these specialized fields; as a result, they are of particular interest to practicing engineers who are enrolled in continuing professional education.

The mini-courses are offered under two umbrella listings and titles, EE640, Topics in Communications Engineering, and EE650, Topics in Solid-State Materials and Devices. Either of these courses may be repeated by a student, since they cover different subject matter each semester. In EE640, for example, the mini-course might be titled "Rate Distortion Theory," or "Pulse Code and Delta Modulation." Examples from EE650 include "Magnetic Memory and Recording," "Silicon Planar Technology," "Image Scanning Devices," and "Preparation and Characterization of Thin Film Circuits." Typically, six of these one-credit, five-week courses are offered each semester, three each under the EE640 and EE650 designations.

They have been successfully offered to both traditional graduate students and to off-campus students (for whom these serve as continuing education). This latter student group receives the courses via Indiana's IHETS television network, and their participation in the mini-courses has typically been greater than in more traditional three-credit courses. For example, enrollment in the traditional courses usually averages about 20 students, whereas the average mini-course enrollments are in the range of 30 to 50 students.

For additional information, contact Robert M. Anderson, Jr., Ball Brothers Professor, 216 Potter Engineering Center, Purdue University, West Lafayette, Indiana 47907.

ENGLISH

A Special Program in English Composition for Science Majors

Realizing the importance of precise scientific writing, faculty members at Michigan State University established writing courses for undergraduate science majors. The English Department proposed a pilot project involving the development of a three-course general education sequence, in collaboration with the Departments of Chemistry and Physics.

The project was planned and staffed by members from the three departments. With the advice of the two science departments, a year-long sequence of courses was developed. The sequence progressed from general writing assignments, through careful reading and analysis of a wide range of scientific writing, to writing about topics within a student's particular science.

In addition to the director, the program has been managed by two graduate assistants from English and one each from Chemistry and Physics. The director and English graduate students taught the course, while the science assistants served as consultants, interns and, occasionally, as teachers. The program also enabled the science assistants to develop important skills in teaching composition. Science faculty from both Chemistry and Physics acted as consultants, meeting occasionally with the director.

Extensive use has been made of student evaluations. Based on these assessments, the director and his staff feel that the principles, organization and details of the sequence are sound. Nevertheless, a number of adjustments will be implemented in the second year. One indication of success is that participating departments have found it necessary to double the size of the program in the second year.

For additional information, contact Dr. E. Fred Carlisle, Department of English, 210 Morrill Hall, Michigan State University, East Lansing, Michigan 48824.

Teaching William Blake's Illuminated Poems

Most of Blake's poetry was meant to be read in combination with elaborately symbolic illustrations, designed and executed by the poet himself. It has been difficult to teach this "total" form of Blake's work to medium-sized or large classes of students, since good color facsimiles either do not exist or are prohibitively expensive. Color slides are suitable for group viewing in the classroom, but do not give students the opportunity to peruse Blake's plates individually to prepare for class meetings, examinations or research papers.

In collaboration with the Office of Instructional Resources at the University of Illinois, and with the aid of a Summer Instructional Development Award, Professor Brian Wilkie has supervised the production of color microfiche reproductions of seven important works by Blake: The Book of Thel, Visions of the Daughters of Albion, Songs of Innocence and of Experience, The Marriage of Heaven and Hell, The Book of Urizen, America, and Europe. The seven works are contained on a set of two microfiche cards, to be used with microfiche-reader machines in the University library. The microfiche cards are accompanied by a 170-page commentary on the seven works, written by Professor Wilkie.

Both comments by students and measurement of their performance indicate that the project has been successful, besides having the obvious advantage of making available the total work Blake intended for his readers.

This instructional package is now available for use by other institutions. For further information, write to Professor Jack Everly, Instructional Media Division, Office of Instructional Resources, Engineering Hall, University of Illinois, Urbana, Illinois 61801.

FAMILY STUDIES

Using Fiction and Drama to Teach about Family Relationships

As an outgrowth of graduate and undergraduate courses in family life education, and using a grant from Purdue University's Institute for Family and Consumer Studies, a 27-minute videotape, "Family Images in Fiction and Drama" has been produced. The tape has the twin purpose of encouraging teachers and student teachers to use creative literature in their family relations classrooms, and of providing students with vivid illustrations of family life principles found in fiction and drama.

"Family Images in Fiction and Drama" employs University drama personnel to portray sections and scenes from such works as Joseph Heller's Something Happened, Edward Albee's Who's Afraid of Virginia Woolf?, Robert Anderson's Double Solitaire, Peter DeVries' Through the Field of Clover, Ingmar Bergman's Scenes from a Marriage, and Dan Wakefield's Starting Over. A narrator indicates the relationship of these scenes to current research on family topics.

The value of literary sources for the family relationship class is summarized in the film with the statement by social psychologist Ronald Fernandez that literature "forces us to come back to man." The point is emphasized that such sources, in tandem with good research materials, should increase the learning and remembering of family life principles.

"Family Images in Fiction and Drama" was produced through the cooperation of Purdue University's Department of Child Development and Family Studies and the Purdue Telecommunication Center. Information about the Department's effort to incorporate literary sources in its education about family relationships, as well as information about obtaining the videotape, can be obtained from Professor Richard K. Kerckhoff, Child Development and Family Studies Department, Purdue University, West Lafayette, Indiana 47907.

GEOGRAPHY

The Audio-Tutorial System in Basic Earth Sciences

In the spring of 1970, the Department of Geography at Wisconsin State University-Eau Claire offered students an option to take the basic earth science series through the audio-tutorial mode of instruction. The course now consists of three parts: the general assembly session, the independent learning center, and the small assembly session. In the general assembly session, all students meet with the instructor for one hour a week. This period is used for a variety of activities: giving examinations, presenting a weekly outline, listening to guest speakers, viewing films, and taking care of administrative details.

The heart of the system is the independent learning center, composed of two rooms, each containing 22 carrels. Each carrel provides the student with a tape recorder and two slide projectors. Between these rooms is a preparation room and a discussion center where students may discuss problems with the faculty assistant or among themselves. The third segment of the system is the small assembly session, in which 10 or 12 students meet with a faculty member for a 30-minute period. During the small assembly session, time is spent on discussion, written exams or oral quizzes.

From several anonymous opinion surveys we find that slightly more than 90 percent of the students would choose this method of learning over the traditional lecture-laboratory system. These results are supported by increasing enrollments. Last semester, evaluation indicated that students mastered the material slightly better under the audio-tutorial system than under the traditional method.

In view of the rather heavy use of equipment, one might be concerned with cost factors. The complete facilities in each room were actually only 10 percent more expensive than a similar installation with traditional laboratory furniture. We have also increased the capacity of the rooms by 50 percent and reduced the per-credit cost of instruction by approximately 25 percent.

For further information, contact Professor Robert Janke or Professor James Foust (Department Chairman), Department of Geography, University of Wisconsin-Eau Claire, Eau Claire, Wisconsin 54701.

A Self-Paced Course in Human Geography

An introductory human geography course using the mastery approach has been operating for eight semesters at Indiana University, Bloomington. The course was developed in response to instructional problems resulting from the diversity of backgrounds, abilities, and interests among students in large introductory courses. The course is based on the philosophy that most students can master the material regardless of aptitude. Stated learning objectives, self-pacing, immediate feedback on progress, and active student response have all been incorporated.

The course introduces students to a variety of human geographical concepts, theoretical frameworks, and skills for manipulating data, and provides them with opportunities for applying these "geographical tools" to issues such as hunger, crime, and poverty. These goals are accomplished through weekly general assembly sessions, audio-tutorial presentations, and discussion sessions. The audio-tutorial presentations make use of tapes which guide students through the maze of readings, diagrams, pictures, tables, music, and maps.

Various phases of the course have been rigorously evaluated over the past eight semesters. In order to compile information to be used in making specific revisions in audio-tutorial presentations, an instrument completed by students, using Likert-like items, was developed. A second evaluation instrument was used to determine whether a relationship existed between the learning procedures and student performance in the course. Finally, follow-up interviews, administered six weeks after the semester ended, assessed students' understanding of the relationships among phases of the course, and measured their general reactions to the course.

The mastery-oriented course is now being taught at Indiana University Southeast, in New Albany, using local staff and facilities. By using certain of the evaluation instruments described above, we have been able to monitor the progress being made in this diffusion project.

For further information, contact Alan L. Backler, Assistant Professor of Geography, Indiana University, Bloomington, Indiana 47401.

HISTORY

Course Revision in European History

During the last year and a half, the survey course on European history since 1815 at Indiana University has been extensively revised by a team of historians and instructional developers from the Audio-Visual Center. Effort has been concentrated in five areas: a) assuring continuity between semesters; b) integrating discussion sections, lectures, and readings; c) making pedagogical goals explicit; e) developing reading and writing skills; and f) finding alternatives to the traditional lecture-discussion format.

Each of the two professors teaching the course created modules in his own areas of specialization and was responsible for teaching the units he designed. Primary emphasis was on basic categories of social history; secondarily, political changes were discussed; and finally, aspects of diplomatic, military, and intellectual history were related to the basic structure of social and political change. Course planning was coordinated through special forms, on which instructors listed lecture topics, discussion questions, and the pedagogical and conceptual strategies for each week. An instructional game, loosely based on William Sheridan Allen's The Nazi Seizure of Power in a German Town, gave students insight into the roots of the Nazi appeal in various socio-economic classes.

Evaluative data has been collected using student surveys, analysis of tests, telephone interviews, and analysis of selected bibliographic information. The results of the evaluation are currently being used to improve the course further.

For additional information, contact David Pace, Assistant Professor of History, 825 Ballantine Hall, Indiana University, Bloomington, Indiana 47401.

Educational Television in Medieval and Renaissance Studies

In the spring of 1976, the National Endowment for the Humanities awarded a grant to The Ohio State University in support of a project entitled "Television Programs in Medieval and Renaissance Studies."

The series chosen for funding is to be a study of "Early English Drama" and will consist of seven units: a) Introduction to Medieval Drama: Monasticism, the Mass, and the "Visit to the Sepulchre"; b) The Achievement of Medieval Church Music Drama; c) Civic Drama I: York and the "Birth of Jesus"; d) Civic Drama II: The Wakefield "Buffeting of Christ" and the Medieval Theater of Cruelty; e) Civic Drama III: The York "Crucifixions" and Analogues in Medieval Art; f) The Any-place Play: Mankind; and g) Humanist Drama: The Nature of the Four Elements. An introductory section designed to place the play in its medieval context will precede the performance of each play in the series.

The films are being produced by the Center for Medieval and Renaissance Studies in conjunction with the Telecommunications Center. The University's television station (WOSU-TV) has agreed to contribute a substantial amount of staff time and resources to the project. The local audience includes a large share of the viewing public of the state of Ohio. The Division of Continuing Education at Ohio State will enable members of the viewing audience to enroll in a course, with a credit option, built around the series of television programs. We expect, however, that most viewers will probably not enroll for formal study.

We hope these television units will be used by members of the Public Broadcasting System in other cities as a regular television series and that teachers at other institutions will use the films, either with or without the introductory units. Ultimately, we plan to produce a documentary series built around two undergraduate interdisciplinary courses on Charlemagne and on Florence which have been offered regularly at The Ohio State University since 1970.

For additional information contact Professor Stanley J. Kahrl, Center for Medieval and Renaissance Studies, 322 Dulles Hall, 230 West 17th Avenue, The Ohio State University, Columbus, Ohio 43210.

LANGUAGE

Videotape Cassettes for Teaching Japanese

The Department of East Asian Languages and Literature at the University of Iowa has been developing videotape cassettes for use in teaching Japanese. The cassettes are designed to articulate with early lessons in the textbook Modern Japanese, by Howard Hibbett and Gen Itaska, published by Harvard University Press. The materials are intended to review vocabulary and structures introduced throughout Eleanor Jordan's Beginning Japanese, and in the early lessons of the Modern Japanese reader.

The cassettes are intended specifically to reinforce learning the grammatical patterns and vocabulary of the Japanese language, as well as to interest the student in Japanese affairs. The format for two of the tapes consists of a native speaker of Japanese speaking about his personal experiences. He uses cultural props, and charts and tables written in Japanese which would help to review the students' written language in addition to spoken language skills. A third tape is specifically related to the Japanese temple Horyuji in Nara, Japan, and is based on a slide sequence of the art and artifacts of the temple with an overvoice of a native speaker describing what is shown.

The tapes are available in 3/4" Sony cassettes and can be duplicated by any CIC school wishing to make use of them. For further information, contact Marleigh Ryan, Department of East Asian Languages and Literature, University of Iowa, Gilmore Hall, Iowa City, Iowa 52242.

LAW

Clinical Studies Through Group Legal Services

Since the 1974-1975 academic year, The Ohio State University College of Law has offered the Group Legal Services Practicum, a clinical law course available to junior and senior law students. The Practicum is conducted twice yearly in cooperation with Laborers' Local 423 Legal Service, a pioneer closed-panel, prepaid, group legal services program established by the membership of the central Ohio Local of the Laborers' International Union.

Association with the Legal Service permits the College of Law to evaluate, influence, and indirectly participate in the dynamic and controversial closed-panel, prepaid practice mode and in the broader field of group legal services delivery systems. The latter field could revolutionize legal practice through effective and economic delivery of quality legal services to the millions of middle-income Americans whose legal needs are not presently met.

The Practicum provides law students with a unique clinical experience. Approximately sixteen students participate each term in general law practice involving problems of middle- and lower-middle income clients. This practice offers an alternative to poverty and criminal law, which have predominated as the subject matter of clinical experiences.

Practicum students, under the supervision of two instructors, participate in the activities of client representation: interviewing, counseling, investigation, case evaluation and analysis, legal research and writing, correspondence and telephone contact, motion and pleading practice, discovery, negotiation, court appearances and observation, and appellate practice.

In addition to client representation, Practicum students develop and participate in preventive law and educational projects, in data collection and evaluation projects, in the preparation of practice materials and forms, and in the development of quality control mechanisms. Students and instructors meet twice weekly in seminar sessions to discuss Practicum cases and projects and to consider issues in the field of legal services delivery.

For further information, contact Professors Stuart M. Israel and Charles A. Thompson, Clinical Programs, Ohio State University College of Law, 1659 North High Street, Columbus, Ohio 43210.

LIBRARY SCIENCE

Library Science Practicum Program

Not all graduate library schools offer practicum or internship programs, perhaps because such programs present difficult administrative problems. Teaching libraries, similar to teaching hospitals, do not exist, although they would be an asset to the current library science educational scene. At the University of Iowa, clinical experience under professional direction has provided a suitable substitute for a more highly structured internship program. The course is an elective, but about 75% of the students choose a practicum experience. Insofar as possible, the student is assigned to a library which matches his or her career objectives and has the opportunity to bring together knowledge and theories learned in library science courses and apply them in supervised library situations.

The practicum course seminar series includes weekly seminars and reading assignments and has been restructured to focus on non-bibliographic topics: personnel, management, supervision, interviewing, job seeking, advertising, and public relations. The student receives three semester hours of credit and must spend a total of 40 hours in the field. Many library practicum supervisors here have gone through the practicum experience and are especially attuned to the program's intent. Clinical experience provides the student with a) an understanding of the overall functions and services of the library department through consultation with the professional supervisor, b) a first-hand knowledge of professional library activities, and c) experience with clerical tasks to provide a basis for training and supervising personnel in these areas.

At the close of the practicum experience the supervising librarian completes an evaluation report on the student's progress, similar to the one used for practice teaching in the College of Education. At least two of the seminar meetings are devoted to student discussion of their practicum experience; usually these discussions are held in small groups, broken down by type of library (i.e., university, school or public). Currently, 25 students are carrying on practicum experiences in a variety of libraries--university, college elementary, junior high and high school, community college, law, hospital and medical, and special libraries.

For further information, contact Frederick Wezeman, Director, School of Library Science, University of Iowa, Iowa City, Iowa 52242.

MEDICINE

Clinical Simulations in Introductory Medicine

During 1975-76, the Indiana University Medical Center prepared a series of problem-solving case studies for the sophomore course, Introduction to Medicine. These cases, programmed in BASIC and stored on the DEC system 10 at the Medical Center, were available to the 270 students in the class. Using any one of the four Decwriter II terminals, the students ran the cases at their convenience, in the learning center area of the Medical Science Building. The clinical simulations and problem sequences developed problem-solving skills in the areas of fluids, electrolytes, and acid-base balance in a tutorial, interactive format. Following a brief sign-on procedure (with a learning center attendant available for help), students ran two cases during a half-hour session. Hard copy printout of the exercise could be taken home by students for subsequent review. These computer programs provide repetitive basic instruction, freeing the author-teacher to serve as a consultant and as an aide for students with individual difficulties.

Based on the experience of 1975-76, the faculty has decided to offer these computer-assisted instructional exercises again during the 1976-77 academic year. In addition, the number of case studies will be increased by fifty percent.

For further information, contact Duke H. Baker, M. D., School of Medicine, IUPUI, Indianapolis, Indiana 46202.

Personalized Study in a Psychiatry Clerkship

A two-month clinical clerkship in psychiatry is required of all candidates for the M.D. degree at The Ohio State University. Each student joins one of seven psychiatric teams under the close and continuing leadership of faculty psychiatrists.

Since October 1974, a Personalized Study Program that has proven highly effective and popular with students and faculty has supplemented the clinical teaching unit. This program recognizes and builds upon individual differences among students (previous knowledge, preferred method and schedule for studying, location of clinical assignments, types of patients encountered, and anticipated future need for psychiatry). It is a modified Keller Plan, similar to the program developed by our Department of Biochemistry for pre-clinical teaching of medical students. Each student is paired with a tutor responsible for only one student per clerkship. Tutors include full- and part-time faculty psychiatrists, psychiatric residents, and medical students who have completed the same program and demonstrated exceptional mastery of the material.

The essential elements of our Personalized Study Program are: a) required textbook, with reading assignments organized around specific topics; b) private meeting with the tutor after studying each unit; c) completion of a practice multiple choice quizzes related to the study topics; d) immediate remedial feedback from the tutor, with identification of problem areas; e) self-pacing progress based on mastery of assignments; f) optional use of other learning aids, including audio-visual materials and scheduled lectures; g) satisfactory performance on a written final examination; h) additional studying and tutoring, with re-examination two months later for students with unsatisfactory examination scores; and i) continuous monitoring by a faculty committee that prepares the standardized practice quizzes, and prepares and grades the final examination.

The first class to participate in this program graduated in 1976. Their National Board Examination psychiatry scores averaged half a standard deviation above the national mean, and were better than those of previous classes by statistically significant measures.

For further information, contact Ian Gregory, M.D., or Donald J. Smeltzer, Department of Psychiatry, University Hospitals (Upham Hall), 473 West Twelfth Avenue, Columbus, Ohio 43210.

Clinical Teaching for Instructional Development

In the summer of 1976, staff members of the Center for Educational Development at the University of Illinois Medical Center studied the clerkship in the Department of Pediatrics. Methodology for the study included videotaping and analyzing seventeen teaching sessions of seven types: the morning report, working rounds, teaching rounds, patient management conferences, lectures, grand rounds, and a journal club meeting.

The videotapes were analyzed according to four categories. Low-level information exchange and questioning included verbal exchange of a factual or procedural nature: reporting, reading, summarizing, giving or asking directions, and giving or asking about procedures. High-order exchange and questioning included: analyzing, comparing, contrasting, evaluating, synthesizing, and predicting in statement or question format.

Analysis of the interaction patterns among instructors, medical students, residents, nurses, and consulting physicians showed more than three fourths of the exchanges to be of a factual or procedural nature. High-order exchange was minimal; factual and discriminative questioning amounted to less than one tenth of the sessions.

If the aim of clinical instruction is to develop clinical judgment, instructors should focus their questions to facilitate this process. Learning sessions composed of factual and discriminative questioning give learners the opportunity to practice the process of clinical problem solving. The question-oriented teaching method becomes congruent with, reinforces, and provides a model for the basic thought process required for medical practice.

One purpose of the study was to generate data for individual instructors regarding the amount of time they spoke during the session, the quality of their statements (factual or discriminative), and the frequency and type of questions they asked of learners. Individual performance results were shared with instructors who desired to improve their teaching and questioning style. Videotapes were played back to the instructors and the teaching sessions were discussed. Some instructors indicated their interest in followup videotaping to determine the extent of teaching style modification.

For further information, contact Annette Yonke, Richard Foley or Jonathan Smilansky, Center for Educational Development, University of Illinois Medical Center, 833 S. Wood, Chicago, Illinois 60606.

Improving Teaching Methods of Health Professionals

For a number of years the Center for Educational Development, University of Illinois Medical Center, has been offering workshops aimed at improving the instructional techniques of health sciences faculty members. Successful experiences in these workshops, accompanied by research and development in the area of instruction, have resulted in a series of packages on instructional skills.

The unique features of these packages are that they: a) allow faculty members to improve instructional skills on their own time; b) give teachers the opportunity to evaluate their own strengths and weaknesses in a specified teaching method in a classroom or simulated setting; c) demonstrate examples of effective and ineffective teaching behaviors; d) give faculty members feedback from educational experts; and e) include a wide array of selected readings, exercises, and other resources available for improving instruction.

Packages have been or are being developed and field tested in the following areas: improving lecture skills, programmed lecture, discussion leader techniques, verbal questioning in clinical and classroom teaching, planning instructional materials in health science education, and instructor playing the role of patient.

For additional information, contact Dr. Richard Foley, Center for Educational Development, University of Illinois Medical Center, 835 S. Wolcott, Room 803 DMP, Chicago, Illinois 60612.

PHYSICAL EDUCATION

Block Program--Professional Preparation of Teachers

The block program is a group of courses required for teacher certification packaged into a professional semester. The 13 credit hours include methods of teaching elementary and secondary physical education, curriculum, educational psychology and field work in public school settings. The content of these courses is integrated through the use of experiential learning techniques and includes models of teaching, movement education, development of instructional materials, sexism, racism, grading and evaluation, theories of learning, and classroom management. Interpersonal skill development is emphasized throughout the semester with opportunities to learn from and give help to peers and staff.

The second component of the program is field work in public school settings. Students have an opportunity to become familiar with a variety of physical education programs and teachers and to develop an ongoing relationship within one program, where they try out teaching behaviors with support and feedback from peers, staff and public school personnel.

The third component of the program is independent student work. Each student is expected to set individual goals and design learning experiences around topics of particular significance for his or her professional development. Support and feedback on individual progress toward personal goals is included in class activities.

The block program has the realistic purpose of preparing students for successful student teaching experiences. Students perceive the relevance of this goal, and there is a highly motivated class climate where faculty members facilitate student learning. An additional resource available to the students is the group of cooperating public school teachers who, in addition to the assistance they give students who come to their classes, also join the students in several seminar sessions during the term.

Overall evaluation of the block program is positive. Students indicated they enjoyed the opportunity to learn from other students and to set and achieve some of their personal goals. Students who elect this program tend to show a preference for collaborative, participatory and independent learning styles.

For further information, contact Shirley Cooper, 3060 CC Recreation Building, The University of Michigan, Ann Arbor, Michigan 48109.

PHYSICS

A PSI Sequence in General Physics

Since 1973, the first of two self-paced courses in general physics, 220T and 221T, has been available as an option to Purdue students. The two courses use a version of the Keller Plan, or personalized system of instruction (PSI), and serve as an alternative to the traditional lecture-recitation-laboratory course format. As with other PSI courses, the most distinctive features of Physics 220T and 221T are clearly stated behavioral objectives, emphasis on mastery learning, repeatable comprehensive testing of students, absolute grading standards which are explained at the outset, and (within limits) self-pacing.

There are no regularly scheduled class meetings. Instead, students come to a special study center at their convenience. Twelve printed study guides contain the stated objectives, a large number of exercises and problems, and detailed problem solutions for the semester's work. Students progress through the units by demonstrating mastery, defined as a score of 80% on the unit test. Tests are administered within the study center, on request, and must be completed by a certain deadline to avoid a grade penalty. Several versions of each test are available, and tests may be repeated; only the highest score counts toward the final grade. Although the student is only required to meet an 80% criterion, most are motivated to repeat the unit test, usually achieving higher scores. Each semester, three comprehensive examinations are also given. These are scheduled at fixed times, but may be repeated once, with the higher score counting toward the final grade. About three-fourths of the students make use of this option.

At the end of each semester, students in 220T and 221T take an examination identical to that taken by counterparts in traditionally taught courses. Over four semesters, final exam scores of the 220T (PSI) and traditional 220 students have been compared, after statistically adjusting for the (small) inter-group differences in SAT scores and high school rank. Each of these quasi-experiments has shown consistently higher scores for students in 220T. The mean difference between group scores corresponds to a difference of one-half to one letter grade. Only a small part of this difference can be attributed to student attrition.

Persons interested in further information may contact Professor R. W. Stanley, Department of Physics, Physics Building, Purdue University, West Lafayette, Indiana 47907.

Physics of Music

This course has a double aim: to teach about acoustics as applied to the practice and experience of music, and to use this material as an example of the way physics approaches a subject, formulates questions, builds models, develops theories, formulates new questions, and begins the cycle again. The course, given without prerequisites, draws a highly varied clientele: about 20% from the School of Music, 20% from the School of Engineering, and the remainder ranging from graduate students in physics to business administration majors.

The main challenge to the teacher is in reconciling the needs, interests, and desires of students with totally diverse backgrounds. This provides a chance to attack the common misconception that the study of physics is "one-dimensional"; that it must follow a fixed "logical" sequence to allow linear ranking of students with regard to their prior knowledge; and that those low on the scale cannot do anything until they have duplicated the studies of the more advanced students. In fact, the study of physics is multidimensional. It is possible to develop material sophisticated enough to be new and interesting for advanced students and elementary enough for students without preparation to follow and enjoy.

The course meets three times a week for one semester, and is structured around lectures with demonstration experiments. Grading is based on two one-hour multiple choice exams and a two-hour multiple choice final, including an "average or final" option, whereby no student gets a course grade lower than what he or she would have on the basis of the cumulative final exam alone. The number of students enrolled has ranged from approximately 70 to 120. Student responses to the standard Physics Department course evaluations rated the course in the upper quartile of departmental offerings.

The following topics are included in the syllabus: forces on oscillating systems, resonance, energy and impedance, systems with many degrees of freedom, vibrating string, introduction to Fourier analysis, intervals and their measurement, scales and temperaments, perception of loudness, anatomy of wave motion, interference and diffraction, acoustic impedance and radiation from a piston. Our own multilithed notes function as a rudimentary text because of the unique approach.

For further information, contact Professor Gabriel Weinreich, Randall Laboratory, University of Michigan, Ann Arbor, Michigan 48109.

SOCIAL WORK

Youth Studies--The Undergraduate Collateral

Persons interested in working with youth in schools, youth agencies, correctional institutions, group homes, recreational facilities, mental health clinics, etc., share a need for understanding youth and their environment based on knowledge and theory from a number of disciplines and professions. At the same time, they need time to reflect on what they are learning about and experiencing with youth. The University of Minnesota Center for Youth Development provides professional growth opportunities for both experienced and beginning youthworkers.

The Youth Studies Collateral is a coordinated, interdisciplinary sequence of courses and experiences for upper division students at the University of Minnesota. The purpose of the Collateral is to establish a beginning knowledge and skill base through integration of knowledge with experiential work with youth. The Collateral is a three quarter commitment of eight credits per quarter, beginning in a fall term, including: a) courses each quarter from psychology, education and sociology; b) 8-10 hours per week in direct work with youth in any one of the hundreds of the youth-serving agencies and programs in the metropolitan area; c) a weekly one and one-half hour seminar using students' case materials from their practice to help students develop insights into themselves as youthworkers.

The Collateral is not viewed as a major or minor. For degree purposes, participating students are registered in any of the colleges of the University which confer a bachelor's degree. The Collateral has been extensively evaluated by Measurement Services at the University of Minnesota.

For further information, contact Miriam Seltzer, Coordinator of Youth Studies, Center for Youth Development and Research, University of Minnesota, Minneapolis, Minnesota 55455. For information on a continuing education program for experienced youthworkers, write Ruth Teeter, National Youthworker Education Project, at the Center.

ZOOLOGY

Use of Videotape in an Introductory Biology Laboratory

For a number of years, it has been a problem to get 500 students in the introductory biology course at the University of Michigan to observe animal behavior patterns prior to experimental analysis of the behaviors. Even with rather obvious and distinct patterns of movements by animals, the quiet observation needed to familiarize one's self with the animal's behavior was not easy to "enforce."

A 17-minute color videotape on the behavior of the Siamese fighting fish, *Betta splendens*, was made with the help of the University of Michigan Television Center. Following some background information, the tape shows a series of interactions between fish during which the behavior patterns of interest are emphasized. Several experimental approaches are demonstrated and discussed with the aid of graphics. The primary emphasis of the tape is the behavior (movements and postures) of the fish. By careful editing, exceptionally clear sequences of behavior could be viewed by the students prior to their own work with fish in the laboratory.

Although we did not measure the effectiveness of the videotape by any formal mechanism, it is clear that this teaching aid has greatly increased the success of the laboratory exercise. Input from both students and teaching assistants indicates that the laboratory is now interesting to a wider array of students. Many more understand the purpose of the experimental analysis since they can more readily recognize the behavior patterns they are to observe.

For further information, contact Brian Hazlett, Division of Biological Sciences, University of Michigan, Ann Arbor, Michigan 48109.

II. Institutional Support

AUTOMATION AND TECHNOLOGY

A Classroom Management System to Maintain Student Progress Records

Beginning in 1976, the Data Analysis Section of Purdue's Measurement and Research Center designed, pilot tested, and began providing service with a new Classroom Management System (CMS). This service is directed primarily toward faculty members responsible for large-enrollment and multiple-section courses, although other teachers have also found the service useful.

The CMS service has two principal objectives. First, it seeks to minimize the often laborious clerical work needed to maintain records of student progress and participation in a course. Secondly, the system seeks to provide accurate, current information on student progress to keep students informed, to help section teachers monitor each student's progress, and to assist the professor-in-charge in monitoring individual student, group, section, or teacher performance. (A related feature of CMS is that it can automatically prepare and address warning slips to students whose performance is poor or marginal.)

CMS is computer-based and has the flexibility to handle a variety of test and quiz scores, laboratory performance scores, attendance records, and similar information. In the near future, it will be able to weight students' scores or other indices by any factor(s) chosen by the faculty. Currently, it can be instructed to: a) assign letter grades on the basis of stated cut-off score values, b) produce histograms of score distributions, c) calculate simple statistics (means, standard deviation, N), d) report students' accumulated scores as percentages of a total, and e) delete the lowest score(s) from a set of several scores. Teachers can receive status reports organized by course section, if desired, and ordered alphabetically by student name, social security number, accumulated score level, etc. Unlike some similar systems, CMS requires no special skills on the part of the faculty; all processing is done by MRC on its mini-computer, following a plan designed in consultation with the faculty member. In a brief session with the teacher, CMS capability is explained and a plan for processing course records is developed. From that point on, the faculty member forwards the student record data to MRC and processing is accomplished routinely.

Since its introduction, the service has grown rapidly; during the spring semester 1977 CMS was being used in more than fifty courses. For more information, contact Mr. John Van Horn, Measurement and Research Center, ENAD 402, Purdue University, West Lafayette, Indiana 47907.

Computerized Assignment and Instructional Strategy Distribution

In an attempt to maximize the benefits and minimize the limitations of compiling relevant instructional strategies, the Rhetoric Program at the University of Iowa has developed a computerized system of sharing and distributing assignments and instructional strategies among rhetoric faculty members. Rhetoric, which includes instruction in speaking, writing and reading, is a required communication skills course which serves over 6,000 undergraduate students each year. The nine regular faculty members and eighty-five teaching assistants come from a variety of backgrounds: Composition, Literature, Creative Writing, Poetry Workshop, Communication Theory, Rhetorical Studies, Film, Broadcasting, English, Theatre, and American Studies. Since the majority of the teaching assistants (who teach the bulk of the courses) have had little or no experience in teaching a communication skills course which integrates speaking, reading and writing, the Rhetoric Program maintains an extensive Professional Development Program through which teachers share backgrounds, interests, skills, abilities, and instructional strategies. Use of a computer-based storage and retrieval system serves both to preserve and to distribute teaching ideas.

During the Assignment Fair held late each semester, each instructor is asked to contribute at least one instructional activity that has worked well in the classroom. These contributions vary from one-day activities to units describing a series of integrated writing, speaking, and reading assignments. Before entry into the data base, contributions are read by a committee for clarity and completeness so that potential users will have maximum understanding of the specific sequence and objectives of the activity.

A computer program called TRIAL is used for data storage and retrieval of the teaching ideas. Although there are obvious limitations to such a system, placing these instructional strategies and assignments on the computer has allowed us to maximize the diverse backgrounds and interests of the Rhetoric Program instructors.

For further information, contact Don Ochs, Rhetoric Department, 71 English-Philosophy Building, University of Iowa, Iowa City, Iowa 52242.

Computer Simulation of Attitude Change in Complex Social Settings

In recent work the author and other researchers have put classical models of the attitude change process into a dynamic mathematical form. These developments in theory make possible unique innovations in the teaching of attitude and value changes in the classroom. Rather than limiting the study of attitude change to the simple model necessitated by ordinary language discussions, computer simulations allow many more complicated representations.

One goal of this project was to extend and modify existing simulation programs in order to make input and output requirements more compatible with the needs of communication arts undergraduate students. Another objective was to augment computer facilities of the Department of Communication Arts. The project seeks to supplement existing courses and pedagogical procedures with a laboratory of complex, simulated social situations which can be explored and manipulated by student users who do not have specialized training.

The amount of time spent working with these students was significantly greater than time spent with others working on different types of projects. This was caused in part by the changing character of the project, and the desire that these students not be penalized for choosing an unusual and risky task. This contact time should decrease as the procedures are better established.

The written documentation allowed most students to access, run, and obtain output from the simulation program in an interactive mode. The other students seemed to be seized by an acute case of what can only be termed "computer anxiety." Individual attention was necessary when these students first ran the simulation program. Visual documentation should minimize these cases.

The simulation project was successful in the sense that all the students obtained a considerable amount of output, were quickly able to explain results from the more trivial models, and were anxious to run the more complex models whose results were not easily explicable. However, there is a need for additional documentation about the theory behind the simulation models.

For additional information, contact Joseph N. Cappella, Professor of Communication Arts, University of Wisconsin-Madison, Vilas Communication Hall, 821 University Avenue, Madison, Wisconsin 53706.

Computer Graphics in Undergraduate Education

Recognizing the need for improved data analysis techniques for undergraduate students in science and mathematics, the University of Wisconsin-Parkside has developed computer graphics software. The software is used in the classroom in a variety of instructional modes.

Student-written computer graphics programs. Students have written on special topics in a Computer Graphics course. These include: coupled, damped, and forced harmonic motion; Coulomb scattering; one-dimensional Schroedinger equation; relativistic distortions; conformal mapping; Conway's game of "life"; and least squares analysis of data.

Graphics terminal for "hands-on" student simulation. Programs have been prepared which allow students to simulate physical experiments, where possible, and to compare their graphics results with laboratory measurements. These programs have been used in advanced laboratory courses, physical chemistry, and electronics.

Computer graphics augmented lecture demonstrations. Program packages have been written in the areas of Fourier analysis, motion of charged particles in electromagnetic fields, Boltzman distribution, chemical kinetics, and conformal mapping. Graphics programs have been used in an interactive mode for classroom demonstration.

Production of instructional video tapes and films. With the assistance of the Media Production Center, a 28-minute video cassette, The Game of Life, has been produced using computer graphics simulation. We have also made a 15-minute video cassette, Applications of Conformal Mapping.

Our terminal is one of fifteen distributed throughout the University of Wisconsin system and connected to the UNIVAC 1110 at the Madison Academic Computing Center. Programs are written in FORTRAN and, with minimal programming effort, the video graphics output may be transmitted to a plotter for high-resolution hardcopy graphics output. All programs are available to all users via public files on the UW system.

For further information, contact M. Firebaugh (for programs on physics), M. Marron (for programs in chemistry), or D. Piele (for programs and videotapes in mathematics), Science Division, University of Wisconsin-Parkside, Kenosha, Wisconsin 53140.

EXTRA-DEPARTMENTAL PROGRAMS FOR THE INDIVIDUAL STUDENT

A New School of Continuing Studies

Through the School of Continuing Studies, Indiana University has developed External Degree Programs for individuals who have not been able to take advantage of traditional college degree programs. Using a variety of innovative teaching methods, the External Degree will help to remove barriers which may have prevented adults from achieving their higher education objectives. Students who participate in the External Degree Programs are generally not required to attend any on-campus classes or activities, although certain concentrations may require on-campus class attendance. When it is convenient, students may be asked to travel to an Indiana University campus for counseling and advising.

All individuals with high school diplomas or general educational development (GED) certificates are eligible. Adults (over 21 years of age) without high school diplomas may be given provisional admission. After they have demonstrated their ability to pursue college level courses by successfully completing 12 semester hours, they may apply for admission as regular students.

Four degree programs and one certificate program are available: Associate of General Studies (AGS), Bachelor of General Studies (BGS), AGS and BGS with concentration in labor studies, and a Certificate in Labor Studies.

There are several special features of the External Degree Programs: They are especially designed for individuals who are not able to be at a specific place at a specific time each semester. The course work required may be completed by various methods--weekend sessions and intensive sessions on various I. U. campuses, off-campus courses, television and radio courses, independent study, and credit by examination for college courses. The students' faculty committees assist in developing programs. Individuals who have acquired competencies through on-the-job work experience, training programs, short courses, and other learning experiences may be able to receive credit; these experiences are evaluated by a faculty committee.

For further information, contact either Dr. Robert Richey, Dean, School of Continuing Studies, Owen Hall 205, Indiana University, Bloomington, Indiana 47401 or Dr. Sylvia Bowman, Special Assistant to the President for External Degree Programs, Krannert Building, 1125 E. 38th Street, Indianapolis, Indiana 46208.

FACULTY DEVELOPMENT

Instructor-designed Questionnaires for Collecting Student Reactions to Instruction

The Center for Research on Learning and Teaching, The University of Michigan, recently devised a system of instructor-designed questionnaires for faculty members who want to use student reaction as one means to evaluate their teaching. Like Purdue's CAFETERIA system, CRLT's approach incorporates general, university-wide core items with specific items about a particular course. Instructors receive a catalog of 148 items, from which they may select up to 30 statements about three areas of instruction: a) student changes in behavior and attitude; b) perceptions of an instructor's style, methods, and abilities; and c) reactions to specific course elements such as written assignments, readings, laboratory work, textbooks, exams or grading.

After the instructor selects the relevant items, CRLT prints enough copies of the individually-designed questionnaire for each student. For each statement, the student indicates degree of endorsement: "strongly agree," "agree," "neither agree nor disagree," "disagree," or "strongly disagree." Answer sheets are returned to CRLT for computer processing, and a listing of results is returned to the instructor. Since the purpose of the CRLT system is diagnostic feedback for improvement of teaching, the only person receiving the results is the person who selected the items.

Teachers using instructor-designed questionnaires may write several items of their own for inclusion on the student rating form. CRLT also encourages teachers to select one or two open-ended questions; anonymous written responses from students often illuminate the statistical picture.

In the first year, the questionnaire was used in over 1000 courses. Well over 90% of users of the initial version of the program stated that they would recommend the system to colleagues who are not collecting student ratings, that the item pool covered their concerns about teaching, and that the results of the ratings would probably affect their future teaching.

For additional information, contact James A. Kulik, Center for Research on Learning and Teaching, The University of Michigan, 109 East Madison, Ann Arbor, Michigan 48109.

College Classroom Video Vignettes

Among the most promising devices to stimulate thoughtful discussion about teaching and learning are videotapes of classroom incidents. The Center for the Teaching Professions at Northwestern University has initiated a project to videotape selected incidents of teaching for use in promoting discussion about specific teaching topics, such as responding to questions in class and mediating class discussion. The videotapes focus on a brief segment of teaching, with an opportunity for viewers to discuss the segment before a second viewing during which viewers check the validity of their observations. This may be followed by an interview involving teacher and students, both alone and together, talking about the teaching/learning experiences which were taped.

This series of tapes will be available for use by instructional improvement and faculty development programs at institutions where the examination of teaching has high priority in the initiation of steps for improvement. The tapes are being developed with support from the Danforth Foundation and a dissemination grant from the W. K. Kellogg Foundation.

The professors who are the subjects of the tapes are teachers who employ a wide range of techniques and behaviors. They were chosen because of their willingness to participate in the taping as well as their recognition that the process would be an opportunity for them to examine and improve their own teaching. The dissemination efforts involving the video vignettes will include workshops about their use as well as a user manual and a handbook.

For further information, contact College Classroom Vignettes Project, The Center for the Teaching Professions, Northwestern University, Evanston, Illinois 60201.

A Seminar and Practicum in Instructional Development

During the past few years at Northwestern University, the Center for the Teaching Professions has provided teaching opportunities for graduate students which are less overwhelming than responsibility for an entire course, but which provide much more freedom than is conventionally permitted the teaching assistant. This program has both a teaching practicum and a preparatory seminar.

The practicum involves teaching a mini-course to undergraduates on a topic of the graduate student's choice. Mini-course instructors design their mini-courses under very broad guidelines including the following: objectives and resource materials (texts, films, and so on) are chosen by the mini-course leader; any teaching method appropriate to the subject matter may be used; the time and duration of group meetings are determined by the mini-course instructor; and grading is done by the mini-course leader according to criteria described in advance to the undergraduate. A general rule of thumb is that for each mini-course, undergraduates should invest about twelve hours (including meetings, readings, projects, and all other activities).

Preceding this practicum, most but not all mini-course leaders have enrolled in the Seminar on College Teaching. Offered during the winter quarter, this seminar emphasizes instructional design and evaluation using the Davis, Alexander, and Yelon text, Learning System Design: An Approach to the Improvement of Instruction. The major seminar project is a unit of instruction which may subsequently be the design for a mini-course. Mini-courses are thus planned in far more detail than is the typical college course. In addition, the seminar professor attempts to visit each mini-course and to meet with the instructors as a group periodically during the term. Graduate students, as well as undergraduates, rate the experience positively, and the program meets the goal of providing a supervised introductory college teaching experience with opportunities for moderate risk taking.

For further information, contact Professor Robert J. Menges, The Center for the Teaching Professions, Northwestern University, Evanston, Illinois, 60201.

INTERDISCIPLINARY PROGRAMS AND COURSES

Integrated Science Program

The Integrated Science Program is a unique degree-producing, three-year undergraduate science-mathematics program within the College of Arts and Sciences at Northwestern. ISP is designed for students with superior high school records and career motivation in the sciences or mathematics. The special curriculum is designed to provide students with a thorough and rigorous background in all the major disciplines of the natural sciences and a superior foundation for graduate work in science or math, either in a traditional specialty or in an interdisciplinary field.

The 24-unit ISP curriculum is composed primarily of special courses taken in a three-year sequence together with 12 units of humanities. ISP begins with a rigorous four-quarter core sequence of physics, chemistry and mathematics designed to build on the students advanced mathematics and chemistry background, and then move rapidly to treatments traditionally reserved for upper division courses. The core sequence is followed by four advanced sequences in life sciences (biophysics, biochemistry, micro-and macro-biological systems), physical sciences (earth, moon, solar system, stellar systems, cosmologies), modern physics (particle and solid-state physics) and mathematics (real analysis, probability). The program also includes a continuing seminar, an off-campus summer field excursion, a special advising system, and the 12 units of humanities.

The ISP curriculum balances the presentation of theory, laboratory work, and computational instruction. A special classroom computer system with video display is planned for demonstration lectures and for student problem-solving. The larger Northwestern computer will be used in advanced sequences. A continuing ISP seminar, using visitors and Northwestern scientists, serves as a special means for learning about current problems and research throughout the sciences. ISP students have great flexibility in their choice of majors and degrees at Northwestern. ISP students may attain the Bachelor of Arts in Science on completion of ISP at the end of three years, providing other graduation requirements have been satisfied. ISP graduates may also, during a fourth year at Northwestern, obtain a second major in any of the departments of science or mathematics, take a second major in an interdisciplinary subject, or earn an M.S. in Biological Sciences, Geological Sciences, or Mathematics.

For further information, contact Dr. Robert C. Speed, Director, Integrated Science Program, and Professor of Geological Sciences, Northwestern University, Evanston, Illinois 60201.

Interprofessional Education

The Commission on the Role of Professions in Society has been established to develop interprofessional curricula and continuing education programs designed to a) educate professional students and practicing professionals about problems of individuals and society that require interprofessional approaches; b) assist professionals in accommodating to changing relationships between consumers and professionals; and c) train professional students in dealing with emerging ethical issues that affect the practices of the so-called "helping professions." The Commission is composed of representatives of six professional schools of The Ohio State University (medicine, nursing, law, social work, education, and public administration), three theological seminaries in metropolitan Columbus, seven organizations of practicing professionals in Ohio, and the Academy for Contemporary Problems.

Three graduate courses, which also provide the pattern for the non-credit continuing education program, are currently offered:

Ethical Issues Common to the Helping Professions, a seminar stressing professional responsibility, engages faculty and students from five of the seven participating professions in the study of complex ethical issues arising from advanced technology: organ transplantation, euthanasia, genetic screening and engineering, mind control through drugs, psychosurgery and behavior modification techniques, malpractice, and the "conspiracy of silence."

The Helping Professions in Total Health Care brings together students and faculty from all seven professions in an attempt to discover interpersonal approaches to problems of hospitalized patients. Cases include a prisoner and drug addict on dialysis, a teenage alcoholic, a family with a severe genetic disease, and a chronic heart patient with personal complications. In each case, medical, legal, personal, social, educational, and organizational issues are identified with a unified approach to the patient's problems is designed.

Changing Societal Values and the Professions offers dialogue among students from the seven professions about the changing nature of professional and client rights, including the nature of values in society, the right of professionals to treat or not to treat, the right of the client to be informed, and the right of confidentiality.

For additional information, write to Mrs. Mary M. Janata, Executive Director, The Commission on the Role of Professions in Society, The Ohio State University, 1712 Neil Avenue, Columbus, Ohio 43210.

III. Cumulative Contents

SUBJECT-MATTER AREA	REPORT	PAGE
ACCOUNTING		
Self-instruction Via Text and Tapes	9	3
AGRICULTURE		
Auto-tutorial Instruction Relates Research and Demonstration	2	3
Experiment in Self-instruction	3	3
In-service Programs for Effective Teaching	10	4
New Curriculum and Teaching Methods in Pest Management	13	3
AGRONOMY		
Audio-tutorial Teaching in Soil Science	5	3
Mediated English Counseling in Field Crops Instructional System	6	3
ANATOMY		
Individual Instruction in Microscopic Anatomy	5	3
ANIMAL SCIENCE		
Simultaneous Teaching of Animal Science at Multiple Locations	6	3
ANTHROPOLOGY		
Computer Analysis of Data on Cultural Change	13	4
ARCHEOLOGY		
INSITE: A Simulation of Archeological Site Excavation	11	3
ARCHITECTURE		
Photogrammetry Offered in Graduate Architecture Program	5	4
Coordinated Design and Drawing Program for Architecture	5	4
Videotapes in Architecture and Sculpture Classes	11	4
Problem Solving and Decision Making Skills in First-Year Design	13	5

ART

8-mm Self-instructional Films Teach Basic Design Skills	3	3
Experimental Teaching of Studio Humanities Program	3	4
Photography in Drawing-Painting Design	3	4
Electroforming Workshop	10	5
Videotapes in Architecture and Sculpture Classes	11	4

ART HISTORY

New Seminar Approach to Ancient Art History	7	3
Self-paced Modular Units in Ancient, Medieval, and Asian Art History	8	3
New Approaches to Teaching Art History: A Follow-up	9	4
An Art/Architectural History Microfiche Program	12	3

ASTRONOMY

An Audio-Visual Program in Introductory Astronomy	13	6
---	----	---

BIOLOGY

Self-study Stations for Laboratory Instruction	1	3
Self-instructional Mini-courses	8	4
Undergraduate Research Participation	9	5

BOTANY

Cinemicrotomic Films for Botany Instruction	4	3
Audio-tutorial Instruction Revisited: Mini-course Credits	9	6
Computer Simulated Laboratories in Botany	13	7

BUSINESS ADMINISTRATION

Special Program in Accounting	3	5
Teaching-learning Seminar for Ph.D. Candidates in Business Administration	5	5
Business Opportunity Program for Inner-city Students	6	8
Audio-tutorial Decision Theory	8	4
Simulating Financial Decision-making Processes	8	5
Practical Experience in Business Administration	9	7
A Real Estate Salesman's Course Via State-wide Television	10	6

CHEMISTRY

Use of TV and VTR in Undergraduate Chemistry Laboratory	4	3
Computer-based Teaching of Organic Chemistry	7	4
Development of a Modular Multipath General Chemistry Program	10	7
Audio-visual Instruction in a Chemistry Laboratory	11	5
The Chemistry of Life: A Series of Short Videotapes	11	6
CHEM TIPS: Individualized Instruction in Teaching Chemistry Courses	11	7
Algorithmization in an Elementary Chemistry Laboratory	12	4
Chemistry Test Generation and Administration by Computer	12	5
Tutorial Assistance for Students in Introductory Chemistry Courses	12	6

CLASSICS

Technical Terminology of Science, Medicine and Humanities	13	8
---	----	---

COMMUNICATION

Using VTR to Test Film Strips	9	8
-------------------------------	---	---

COMPUTER SCIENCE

Development of a Self-paced Mastery Instructional System Using a Computer Management and Grading Program	10	8
Computer Programming and Numerical Methods	12	7
A Self-Paced Instructional System in Basic Computer Programming	13	9

CONSERVATION

Integrated Course in Conservation Education	3	7
---	---	---

COUNSELING

Computer Assist Counseling (COASCON)	6	4
Status Report on the UWM Computerized Guidance Programs	9	8
Interpersonal Communication Training in Residence Halls	10	9

CULTURAL STUDIES

FOCUS: BLACK AMERICA	5	27
Introduction to Expository Writing	10	3
Research in Latin American Studies Through Case Problems	11	8
AV Modules on the People's Republic of China	11	9
Interdisciplinary Courses and Programs in Middle Eastern Studies	11	10
The Classical Humanities Learning Center	11	11
Image of Blacks in American Films: 1903-1950's	12	8
An Alternative to Traditionally Organized Study Abroad Programs	12	9
Foreign Student Resources Add an Intercultural Perspective	13	10
Intercultural Communication and Issues in Freshman Rhetoric Classes	13	11

DENTISTRY

Single-concept Films Supplement Instruction	2	4
CAI Training Course in Periodontics	5	6
Self-evaluation of Dental Training Through CAI Simulation	7	5
Audiovisual and CAI Programming in Dental Materials and Dental Hygiene	8	6
Individualized Programs of Study in Dentistry	10	10
Teaching Oral Cancer Recognition Through Computers and Slides	10	11
The Programmed Lecture in Oral Surgery	13	12

DESIGN

Independent Study Units for Learning After-image Color Perception	9	10
---	---	----

ECONOMICS

Teaching Information Processing System	3	7
New Instrument for Measuring Student Performance in Economics	5	7
Simulation of a World Economy	7	6
A Training Program for TAs Using Videotapes, a Seminar and a Tape Library	10	12
Teacher Training Programs in Economics	12	10
Audio and Videotapes in Elementary Economics Courses	13	13

EDUCATION

Systems Approach in a Professional Course	1	5
Teaching and Simulated Teaching on Videotape	1	6
Radio-telephone Networks for In-service Instruction	1	6
"Stimulus Films" as a Basis for Teaching Educational Psychology	3	9
Preparation of Pre-service Teacher-education Students in Educational Research and Development	4	5
Elementary School Science-mathematics Teaching Laboratory	4	6
Iowa UPSTEP: A New Program in Science Education	7	6
A Self-instruction Lab for the Operation of AV Equipment and Production of Simple Instructional Materials	8	8
A Competency Based Reading Instruction Course	8	9
Improvement of College Instruction in the School of Agriculture	8	9
A Mastery Learning Course	9	11
Project RELATE: Interdisciplinary Instruction in Language Arts Teaching	9	12
Self-instructional Units on Evaluation and Research	9	13
Teacher Training Centers	9	14
Personalized Instruction in Educational Psychology	10	13
Computer Exercise in the Diagnosis and Treatment of Adult Illiteracy	11	12
A Program for Alternative Careers in Education	12	11
An Experimental Course in Issues and Methods of Values Education	12	12

ENGINEERING

Mechanical Engineering: Computer Use in Senior Design Program	3	11
Instructional Use of the Computer in Civil Engineering and Hydraulics	3	11
Teaching Key punch Operation Via Videotape	4	7
Use of ITV for Regional Engineering Programs	5	8
Advanced Professional Program in Engineering	6	5
TV Solves Logistical Problems in Fluid Mechanics Lab	6	6
Interdisciplinary Engineering Studies	7	8
Use of Tape Recorders for Grading Engineering Papers	7	8
New Courses Related to Man and His Environment	7	9
Oral Exams and Varied Scheduling	8	10
Team Teaching in Short Blocks	8	11
Technology and Society	8	11
Student-paced Learning in a Test-based, Multimedia Laboratory	9	15
The Professional Development Degree	9	16
An Experiment on Integration of Engineering Courses	10	14
A Packaged, Marketed Course in Vacuum Technology	10	15
Developing an Interface Between Engineering and the Social Sciences	10	16
"The Man Series": Interdisciplinary Courses on Technology and Social Problems	10	17
Computer-administered Quizzes in Engineering	11	13
Engineering Counselor-Tutorial Program	11	14
A Self-paced Instructional Approach for a Dynamic Systems and Controls Laboratory	12	13
Technologically Oriented Games for Non-Engineering Majors	12	14
Continuing and In-Service Training for Engineers	12	15
A New Co-op Program in Engineering	12	16
Computer Graphics in Chemical Engineering Gaming and Simulation	13	14
Graduate Electrical Engineering Mini-Courses	13	15

ENGLISH

Film as Literature	7	9
Reading Skills Laboratory for Freshman Comprehensive English Course	7	10
Full-length Feature-film Adaptations to Stimulate and Improve Reading of Required Texts and Expository Writing	8	12
Poetry and Literary Study: A New Approach and New Materials	8	13
Self-paced Materials for Teaching Rhetoric	10	18
Student Led Discussion Groups in Large Lecture Courses	10	19
Program for Teachers of Freshman Composition	11	15
The Improvement of Writing Skills	12	17
An Individualized Writer's Workshop	12	18
English Placement Test at the University of Wisconsin	12	19
A Special Program in English Composition for Science Majors	13	16
Teaching William Blake's Illuminated Poems	13	17

FAMILY STUDIES

Using Fiction and Drama to Teach about Family Relationships	13	18
---	----	----

GEOGRAPHY

Multimedia Experiment in Regional Geography	5	9
Teaching About the Natural Environment Through the Use of Visual Materials	10	21
Teaching Preparation for Graduate Students in Geography	11	16
The Audio-Tutorial System in Basic Earth Sciences	13	19
A Self-Paced Course in Human Geography	13	20

GEOLOGY

Earth Sciences Lab Uses Auto-tutorial Approach	5	10
--	---	----

HISTORY

"The Film as Social History: World War II as Portrayed in the American Film, 1939-1945"	10	22
Course Revision in European History	13	21
Educational Television in Medieval and Renaissance Studies	13	22

HOME ECONOMICS

Self-instruction: Textiles, Clothing, and Society	6	7
Development of a Peer Group Mediated Learning Model in Human Sexuality	10	20
Development of a Modularized Core Program in Human Ecology	12	26

JOURNALISM

Using New Media for Journalism Instruction	4	8
Specialized Writing Program for Journalists	5	11
A Venture in Journalistic Simulation	7	11

LANGUAGE

Multiple-credit Elementary French Course	1	9
Research on Improved Methods of Measuring Proficiency and Achievement in Foreign Languages	1	10
System for Teaching German in Field Trial	2	8
New Approaches to the Teaching of Chinese	4	9
A New Course in Russian Civilization	7	12
A New German Grammar	8	16
CAI in Latin	9	17
Evaluation of Self-paced Instructional System for First-year Course in German	9	18
CAI in Beginning Ancient Greek	10	23
Videotape Cassettes for Teaching Japanese	13	23

LAW

Audio-visual Teaching Aids in Law	5	11
Clinical Training in Law	8	18
Computer Exercises for Law Students	10	24
Videotape Review of Teaching Techniques in Law Courses	11	17
Network Development for Computer-based Exercises in Legal Education	12	20
Clinical Studies Through Group Legal Services	13	24

LIBRARY SCIENCE

Realism in Teaching Reference Work	8	19
Self-instruction on Library Procedures	10	25
Library Science Practicum Program	13	25

MATHEMATICS

Support from Main Campus to Branch College	2	8
Computer Instruction in Mathematics	7	12
Individualized Instruction in Mathematics	7	13
Individualized Supplementary Calculus Instruction (ISCI)	10	26
A Remedial Tutorial Program in Mathematics for Elementary Teachers	12	21

MEDICINE

Computer Simulations for Instruction and Evaluation	2	9
"Auto-didactic" Laboratory	3	13
New Programs in Medical Communications, Circulation Technology	6	9
MD Training Span Reduced, Patient Care Increased	6	10
Computer-assisted Independent Study in a Pilot Medical School	7	14
Intercalated Year Program in Medicine	7	15
Self-instruction in Pathology	7	15
Integrated Premedical-medical Program	8	19
A Medical Campus the Size of Indiana	10	27
Instructional Research and Development in Pediatric-cardiology	10	28
Learning Resource Development Center, College of Medicine	10	29
Simulation Technique in the Teaching and Testing of Problem-solving Skills	10	30
Systematic Inquiry and the Education of Health Sciences Faculty	10	31
Workshop for Authors of Written Simulations in Medical Diagnosis and Patient Management	10	32
Medical Education Resources Program	11	18
Workshop for Developing Self-instructional Materials	11	19
An Independent Study Learning Option in the Basic Medical Sciences	12	22
Instructional Effectiveness of Simulation Technology in Medical Education	12	23

A Personalized System of Instruction in Medical School Biochemistry	12	24
Evaluation Model for an Integrated Premedical-Medical Program	12	25
Clinical Simulations in Introductory Medicine	13	26
Personalized Study in a Psychiatry Clerkship	13	27
Clinical Teaching for Instructional Development	13	28
Improving Teaching Methods of Health Professionals	13	29
MICROBIOLOGY		
"Microbiology--What is it?": A Slide and Film Presentation	9	20
MUSIC		
Programmed Unit Added to Theory Sequence	2	10
An Integrative Teaching Model in Music Education	7	16
CAI for Music Theory	8	20
An Electronic Piano Laboratory for Piano Pedagogy	8	21
NATURAL RESOURCES		
Computer Simulation of Fish Populations	5	13
NURSING		
Video Tapes for Teaching Administration of Medications	1	12
Instructional Units in Posology, Vitamins and Immunology	1	13
Multimedia Project in Nursing	4	11
Multimedia Learning System in Nursing	6	10
Curricular Flexibility in Nursing Education	8	22
Independent Study and Multimedia Programmed Learning in Nursing	10	33
Learning Resources Center for Nursing	11	20
PHARMACY		
CCTV Used for Continuing Pharmacy Education	5	13
Continuing Education in Pharmacy Via Tele-communications Network	5	14
Cassette Tapes for an Extension Course	8	22
Teaching Through a Combination of Videotape, Computer and Printed Copy	10	34
Audiotutorial Instruction in Medical Pharmacology	11	21

PHILOSOPHY

Graduate Student Teaching Internship Program in Philosophy	7	17
Evaluation of Academic Progress Through Weekly Cumulative Tests	10	35
The Development of a Computer Assisted Course in Introductory Logic	11	22

PHYSICAL EDUCATION

Integrated Audiovisual Presentations and Workbooks in the Teaching of Physical Education	10	36
The Use of Media in Ballroom Dance Classes	12	27
Block Program--Professional Preparation of Teachers	13	30

PHYSICAL THERAPY

Media-based Instructional Variations	9	21
--------------------------------------	---	----

PHYSICS

Computer Use in Physics Instruction	3	15
A Slow-Paced Physics Course Sequence	12	28
A PSI Sequence in General Physics	13	31
Physics of Music	13	32

PHYSIOLOGY

Programmed Preparation in Laboratory	2	11
--------------------------------------	---	----

POLICE SCIENCE

Educational Programs for Law Enforcement Agencies	5	16
Hospital-based Ambulance Service	5	17

POLITICAL SCIENCE

Simulation Laboratory for Inter-nation Decision Making	1	14
Advanced Research and Analysis Seminar on Selected Topics	2	12
Using Multimedia in a Large Enrollment Course	8	23
Field Participation in Campaign Politics	9	22
Small-group Teaching of Social Science Research Methods	9	23
Simulation Game on the Arab-Israeli Conflict	12	29

PSYCHOLOGY

"Psychology of College Teaching": New Course at Purdue	1	15
Experimental Course Laboratory in a Mental Hospital	3	16
A Seminar in the Teaching of Psychology	4	13
Cafeteria of Learning for Introductory Psychology	7	18
Observing Interpersonal Behavior Via Videotape Recording	7	19
Teaching Students Sensitivity to Children	7	19
Computer Simulations for Teaching Research Design in Elementary Experimental Psychology	8	24
Videotapes Combined with Discussions	8	24
A Test Item Pool Designed to Stimulate and Measure Creative Thinking in Psychology	8	25
A Seminar on Teaching	9	24
Sliding Point, Contract Teaching in Psychology	9	25
Student-generated Multimedia Instructional Units	9	26
Undergraduate Participation in Setting Objectives and Evaluating Products	9	27
A Contingency-managed and Individualized Course in Behavior Modification	11	23
The Use of Color Film in a Large Introductory Psychology Course	11	24
Project OUTREACH: Psychology Students in the Community	11	25
PSI in a Child Psychology Course	11	26
Mini-courses in an Introductory Psychology Lecture Course	11	27
A Minicourse Program in Educational Psychology	12	30
Learning/Grading Options in Abnormal Psychology	12	31

SOCIAL WORK

Self-instructional Program to Teach Interviewing Skills	1	17
Interviewing Techniques Evaluated Via Videotape	5	17
Self-instructional Slide/Tape Presentations to Introduce Social Work Students to Community Services	8	26
Youth Studies--The Undergraduate Collateral	13	33

SOCIOLOGY

Educational Games in Social Psychology	2	15
SIMSEARCH (Research Simulations)	10	37
Study of Criminology Through a European Tour	11	28
The Use of Literature in Teaching Introductory Sociology	11	29

SPEECH

Videotape and Social Action in Discussion	3	16
---	---	----

STATISTICS

Auto-tutorial Teaching in Social Science Statistics	9	28
PSI: An Optional Mode of Instruction in a Statistics Course	12	32

TELEVISION/RADIO

Revising Broadcasting Course Through Task Analysis	6	13
--	---	----

ZOOLOGY

Use of Microfiche in the Invertebrate Zoology Laboratory	12	33
Use of Videotape in an Introductory Biology Laboratory	13	34

INSTITUTIONAL SUPPORT

ADMINISTRATIVE LEVEL ARRANGEMENTS

Support for Departmental Self-study	1	22
University-wide Curriculum Revision	1	24
Center for Research on Learning and Teaching	4	19
"Credit by Exam" Offered in Experimental Program	4	20
New Careers and New Dimensions Programs	6	18
A Center for the Teaching Professions	6	20
Centralized Learning and Information Office	7	23
Educational Development Fund: A Fund for Improving Instruction and Educational Programs at Minnesota	7	23
Undergraduate Education Curriculum Development	7	25
University of Wisconsin Undergraduate Teaching Improvement Fund	8	29
University College: A College for Experimental Degree Programs	8	30
Curriculum and Faculty Liaison Between the University and High Schools	10	41
Institute for Administrative Advancement	11	33
Changing the Graduation Requirements for Students in the Liberal Arts	11	34
Reorganization of an Instructional Services Agency	11	35

AUTOMATION AND TECHNOLOGY

Dial-access Learning System	2	19
TV Network Links Two Universities and Extension Campuses	2	21
Off-Campus Graduate Center Gets AV Links	2	23
Computer-based Education Research Laboratory	3	21
Videotape Recordings of Classroom Lectures as Device to Critique Conventional Teaching Performance	3	24
Educational Telephone Network as a Vehicle for College Instruction	4	23
Instructional Media Laboratory	4	24
Modular Film Design for Media Study and Teacher Education	4	25
Library with an Electronic Dimension	5	23
Multimedia Instruction in Extension	5	24

Rural Adult Education Program	7	26
Open University by Radio	9	31
CATV as an Educational Resource	10	42
Development of the Educational Uses of Slow-scan Television	10	43
Off-campus Electronic Media Programming for Engineering, Architecture, Mathematics and Applied Science	10	44
Project NU-CAT (Computer Aids to Teaching)	10	45
College of Education Computer Lab	11	36
Instructional Media Distribution Center	11	37
Computer-Managed Interactive Television in Undergraduate and Life-Long Education	12	37
A Classroom Management System to Maintain Student Progress Records	13	37
Computerized Assignment and Instructional Strategy Distribution	13	38
Computer Simulation of Attitude Change in Complex Social Settings	13	39
Computer Graphics in Undergraduate Education	13	40

FACULTY DEVELOPMENT

Faculty Awards for Improvement of Undergraduate Instruction	3	21
Summer Grants to Improve Instruction	4	22
Instructional Development Project	4	27
System Training Program for Graduate Teaching Assistants	5	29
Seminar on College Teaching	7	29
Residence Hall Training Program	8	33
Skills for the Beginning Teacher	9	32
A "Cafeteria" Program for Teacher Evaluation	10	46
Handbook of Instructional Resources	11	38
A Faculty Fellow Program in the Center for the Teaching Professions	11	39
Purdue's CAFETERIA Instructional Evaluation System: An Update	12	38
Instructor-designed Questionnaires for Collecting Student Reactions to Instruction	13	42
College Classroom Video Vignettes	13	43
A Seminar and Practicum in Instructional Development	13	44

INTERDISCIPLINARY PROGRAMS AND COURSES

Behavioral Sciences Lab is "Active Learning" Center	2	24
Institutes Action Study Program	4	27
Interdisciplinary Course in Freshman Perspectives	6	21
The Social Science Program at Minnesota	6	22
The Project Community at The University of Michigan	7	27
Course Mart	8	31
An Interdisciplinary Course on Planning a Livable Future	10	47
Women's Studies	10	48
Role Models for Women Science Undergraduates	12	39
Integrated Science Program	13	45
Interprofessional Education	13	46

MEASUREMENT AND EVALUATION

Development and Research on the Course Evaluation Questionnaire	1	25
Research and Development of Improved Way for Testing Placement and Proficiency of New and Continuing Students	2	25
Pass-fail Grading Experiment	4	21
Faculty Seminar/Workshop for Instructional Development and Evaluation	5	27
Instructor Rating Scales	5	28
Student Instructional Rating System	6	25
Test Scoring Through Interactive Terminals	11	40
Computer Programs Provide Better Management of Large Enrollment Courses	11	42
A Computer Program to Record Test Scores and Evaluate Student Performance in Large Courses	12	40

EXTRA-DEPARTMENTAL PROGRAMS FOR THE INDIVIDUAL STUDENT

Residential College for Community Studies	9	33
Human Potential: A Residential Seminar on Personal Development	9	34
Individual Plans of Study for the B.A. or B.S. Degree	9	35
Man, Science and Society: An "Open Seminar"	9	36
Problem-focused Instruction and Student-initiated Learning	9	37
Student Involvement in Pilot Program	9	38
The Bachelor of General Studies Degree After Four Years	9	38
The Role of Students in the Residential College	9	39
Variable Credit Tutorial Course for Freshmen	9	40
A Residential Academic Program: The Living Learning Center	11	43
Cooperative Education Program for Liberal Arts Students	12	41
External Degree Programs at the University of Iowa	12	42
A New School of Continuing Studies	13	41

ARCHIVAL INDEX

The following items are deleted from the Cumulative Index. They reference projects which, for one reason or another, are no longer active.

SUBJECT-MATTER AREA	REPORT	PAGE
BIOCHEMISTRY		
Developing the Knowledge Domain for Teaching Metabolism	7	3
BIOLOGY		
Unified Curriculum in Biological Sciences	1	3
BUSINESS ADMINISTRATION		
Three-faceted Approach for Teaching Accounting	2	3
Marketing and Political Action	8	6
CHEMISTRY		
Television in the General Chemistry Laboratory	3	6
DAIRY SCIENCE		
Non-pasteurized Learning	9	9
ECONOMICS		
Application of Principles of Programmed Instruction to a Televised Course	1	4
Computer Test Scoring and Analysis	8	7
EDUCATION		
In-service Instruction Via "Tele-lecture"	1	6
Instructional Systems in Teacher Education	2	5
Tutorial and Clinical Program in Teacher Education	3	9
Internship for College Teachers of Education	4	4
Project MODELS: An Environment for Increasing Learning Efficiency and Conducting Research and Development	4	7
Special Training for Inner-city School Administrators	5	7
ENGINEERING		
Programmed Instruction in Pre-engineering Graphics	1	7
Multimedia Classroom for Faculty-to-be	2	7
Educational Films for Electrical Engineering	5	8
Computer Graphics in Electrical Engineering	6	6
Individualized Techniques Applied to Freshman Engineering Graphics	7	7

ENGLISH		
Individualized Instruction in Composition	1	8
Measurement and Evaluation of English Proficiency	1	8
Evaluation of Written Composition	2	7
HISTORY		
The Study of American History Via Discussion Groups	3	12
Discussion Groups in Large Intermediate-level History Courses	8	14
Development of Options in a History Course	8	15
LANGUAGE		
Self-instructional Format for Teaching Russian	1	9
Instructional Materials for German and French	1	10
Hebrew Language Study With a Programmed Text and Tape	8	17
LAW		
Students Work with City and State Officials in Two Law Seminars	5	12
LIBRARY SCIENCE		
Video Tape and Film Use in Library Orientation	1	11
Teaching an Extension Course Via Tele-lecture	4	10
MATHEMATICS		
Teaching Algebra with Programmed Materials	1	12
Programming Beginning Algebra	3	13
Mathematics Laboratory Project for Elementary Teachers	4	11
Drill and Practice Individualization by CAI for Algebra	9	19
MEDICINE		
Continuing Education for Physicians	3	14

MUSIC		
Use of Radio in Music History Course	5	12
PHILOSOPHY		
Philosopher Seminar Program	5	15
PHYSICS		
A Graduate Seminar in Physics Teaching	4	12
Evaluating Student Learning in Simulated Physics Lab Problem	5	15
POLITICAL SCIENCE		
Evaluation of Televised Course in American Government	2	13
PSYCHOLOGY		
Computer Assisted Instruction	1	15
Introductory Psychology: Lectures on Film	2	14
Project OUTREACH	2	14
Using TV to Instigate Class Discussion	4	14
Introductory Psychology for Inner City Blacks	6	12
SOCIOLOGY		
A Developing Sequence of Integrated Statistics and Methods	4	15
SPEECH		
Peer Group Ratings, Television Lectures, Facilitate Handling of Increased Enrollment	2	16
Computerized Evaluation and Simulation of Group Discussion Processes	4	15
Evaluation of Learning in Introductory Speech	5	18
Video-taped Informative Speech Models	5	19
ZOOLOGY		
A Microfiche System for a Self-Instructional Laboratory in Zoology	11	30

INSTITUTIONAL SUPPORT

ADMINISTRATIVE LEVEL ARRANGEMENTS

Experimental College at Michigan State	1	21
Coordination of Learning, Media and Evaluation Services	1	21
The Pilot Project	2	19
College Within a College	4	19
Center for Curriculum Studies	4	26
Special Educational Opportunities Program	5	23
Bachelor of General Studies Degree	6	17
Special Programs for the Disadvantaged	6	18
University of Illinois' Commission for the Reform of Undergraduate Education and Living	7	26

AUTOMATION AND TECHNOLOGY

Library of Non-print Instructional Materials	1	23
CAI Introduced at Purdue	2	20
Systems Approach for Extension Campus	2	22
Decentralized Instructional Television	3	22
Minnesota Television Feasibility Study	3	23
Dial-access Video and Audio Learning System	4	22
On-line Computer System for Instruction	5	25
A Programmed Course in Programming	5	29

FACULTY DEVELOPMENT

Plan to Maintain Teaching Standards	1	24
Seminar for Professors to Consider Science-values Issue	2	23
Broad-scale Study of TA Role	2	27
Training Prospective College Teachers	3	27

INTERDISCIPLINARY PROGRAMS AND COURSES

Field Study in the City	5	26
Interdisciplinary Approach to Urban Problems	6	21
Arts and Sciences Course Taught in Foreign Languages	3	25
Honors Humanities Core for Freshmen	3	26

MEASUREMENT AND EVALUATION

New Instructional Rating Report	2	26
Freshman Placement and Proficiency System	6	24
Course and Instructor Evaluation	7	28
Computer Generated Repeatable Testing for Large University Classes	8	32
GRADER: A Computerized Record Keeping System	11	41

EXTRA-DEPARTMENTAL PROGRAMS FOR THE INDIVIDUAL STUDENT

Pilot Program at the University of Michigan	7	24
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